INTERNATIONAL BACCALAUREATE
BACCALAURÉAT INTERNATIONAL
BACHILLERATO INTERNACIONAL

MARKSCHEME

November 2000

DESIGN TECHNOLOGY

Higher Level

Paper 3

11 pages

Option D – Food technology

D1. (a) The staff are not qualified chefs (cooks) and are trained to carry out specific tasks.
For efficiency purposes the food products must all be the same. Consumers buy such food products regularly and know what to expect from a standardised product.
*(**[2 marks]** for **one** reason suitably explained)*

(b) Size; ingredients; shape; colour; texture; taste.
*(any **two** aspects, **[1 mark]** each)*

(c) Advantages:
Customers know what to expect; a limited menu, so high volumes and lower costs for the customer. Efficient production cuts waiting time.
Easier quality control across a narrow range of products.
*(**[1 mark]** for any **one**)*

Disadvantages:
Could get bored with the same menu each visit; an unbalanced diet.
*(**[1 mark]** for either)*

D2. Taste - if the dough is pre-frozen and then baked.
Texture - the length of time left in the oven or the temperature variation.
*(any suitable explanation related to a specific organoleptic property **[2 marks]**)*

D3. A generic term for substances which are added to foods during processing to modify properties. ***[1 mark]***

D4. The date by which the product should be used.
Storage information.
List of ingredients.
Nutritional composition.
Cooking instructions.
Common allergies, *e.g.* nuts.
*(any **two**, **[1 mark]** each)*

D5. Issues relate to:

Cultural factors, especially in relation to new technologies.
Ethical factors such as whether modifying food genes is a correct thing to do, even if the technology is available to do it.
Food production in different countries and the ability to feed the population.
Medical issues relating to the control of diseases by the use of modified food.
Fears for future health, *i.e.* no long-term tests possible yet.
The destruction of the natural habitat for flora and fauna.
The visual effect on the environment.
Government attitudes and legislation.
The effect of media coverage in different countries.
The views of the medical profession in different countries.
Poor labelling of food packaging not allowing the consumer to choose.
The attitude of large food outlets in relation to food production and stocks.
The influence of pressure groups in different countries.
International food markets and distribution of food.
Solving world food storage.
Differing attitudes to food supply and diet, especially between poor countries and wealthy countries.
Possible future technological developments in relation to food production.
Concerns over the increase in diseases such as cancer linked to food intake and food production techniques.

*(**four** issues, suitably explained within a given context, **[2 marks]** each. **[1 mark]** extra for a well-structured overall discussion emphasising the complexity of the debate)*

Option E – Computer aided design and manufacturing

E1. (a) Computer-integrated manufacturing. ***[1 mark]***

(b) The efficiency of both batch production and mass production depends upon uniformity of product reducing the options for flexibility of type of output but increases productivity, *i.e.* economies of scale. ***[2 marks]***

(c) Computer-integrated manufacturing allows greater flexibility as the production system is linked directly to sales and customers' requirements via the computer. ***[2 marks]***

E2. Change of skills.
Cleaner environment.
Reduction of hazardous activities.
Reduced employment needs.
Flexible working hours.
Less social interaction.
*(any **one** impact outlined in relation to CAD/CAM, **[2 marks]**)*

E3. Optical fibres are costly to install.
Routing fibres between communication devices can be problematic.
The fibres are delicate and need good protection.
*(any **one** disadvantage, **[2 marks]**)*

E4. A series of weighted algorithms or models programmed into a computer. ***[1 mark]***
to simulate human thought. ***[1 mark]***

E5. AGVs: guided by electronic strip, they carry components/products about the factory.
Robots: carry out a wide variety of tasks, *e.g.* welding.
they can load/off-load components into an AGV.
both robots and AGVs replace humans who would have carried out the tasks.
the automated production system is computer-controlled and robots / AGVs are part of the system.
*(any **four** points, suitably explained, **[2 marks]** each, **[1 mark]** extra for using a suitable example, maximum **[6 marks]** if **only** robots **or** AGVs discussed and not both)*

Option F – Invention, innovation and design

F1. (a) Smaller engines. ***[1 mark]***

(b) Increased market for different sized cars, *e.g.* two-car families.
Efficiency of production techniques caused cheaper cars, making them available to more people.
Increased wealth of people in industrialised countries.
In the 1960s, energy costs were low, so large cars were relatively cheap to run.
*(**one** reason suitably outlined, **[2 marks]**)*

(c) Increased technological developments may produce designs to compete with petrol-driven cars.
Change of attitude of the car-buying public towards more environmentally friendly transport.
Spiralling costs of oil and oil-based products, making electricity a cheap energy source.
New legislation forcing manufacturers to produce more environmentally-friendly vehicles.
Households with more than one car may prefer to have one electric car and one petrol-driven car for longer journeys.
Fashions may change and electric cars may become trendy.
New legislation curbing pollution from petrol and diesel engines.
*(any **three** reasons, **[1 mark]** each)*

F2. Digital telephones allow for more interface with other communication devices.
Digital signals are more reliable and have less interference.
Digital systems have a far greater capacity for transmitting information.
Digital telephones allow for speed dialling and faster connections.
Within a frequency band width there is scope for greater capacity.
*(any **three** advantages, **[1 mark]** each)*

F3. A technophile welcomes all technological developments. ***[1 mark]***
A technophobe fears all new technological developments. ***[1 mark]***

F4. **Technology**: New materials, *e.g.* superpolymers and elastomers.
New manufacturing technologies for moulding the shoe and joining components.
Features, *e.g.* inflated soles; luminescent heels; built-in calorie counters, *etc*.

Lifestyle: The training shoe as an everyday item rather than just for sport.
The appeal of the shoe to all ages.
The influence of fashion.
The training shoe as a status symbol.
The increase in popularity of sports and outdoor pursuits.
The influence of the media - advertising and marketing.
The influence of sports stars.

*(any four points, suitably discussed, **[2 marks]** each; **[1 mark]** extra for a good balance of discussion between technology and lifestyle influences, maximum **[6 marks]** if **only** technology **or** lifestyle discussed and not both)*

Option G – Health by design

G1. (a) 1987 ***[1 mark]***

(b) Listeria and VTEC0157 are recorded in hundreds and Campylobacter and Salmonella in tens of thousands, so the scale of one graph would be huge and not allow for easy comparison of patterns. ***[1 mark]***

(c) Since 1987 it has shown a decline ***[1 mark]***, while all the others have increased ***[1 mark]***.

(d) The popularity of fast-food outlets ***[1 mark]*** which sell an increasing amount of burgers ***[1 mark]***.

G2. A technique for producing an image of a slice through the body. ***[1 mark]***

G3. Both plastic and cosmetic surgery involve the repairing or improving of damaged, diseased or unsatisfactorily shaped parts of the human body ***[1 mark]***, but cosmetic surgery is carried out at the request of the individual for needs of personal satisfaction and self-esteem rather than medical need ***[1 mark]***.

G4. Disposable, one-day or one-week contact lenses are available.
Planned obsolescence means products are designed with a known, limited life-span.
The benefit to the consumer is not having to clean and store conventional lenses each day.
*(**[1 mark]** per distinct point up to a maximum of **[2 marks]**)*

G5. Many examples possible, *e.g.* nuclear power stations:

risk to people working in stations from exposure to high levels of radiation.
risk to people living near stations from either accidental exposure to high levels of radiation or prolonged exposure over a long period of time.
risk of radiation contaminating soil, water and air from leaks.
risk to wider groups of people from a major accident such as Chernobyl.
risk from radioactive waste both transporting it and storing it.

Minimise risks by:

regular health screening of workers.
maintaining strict security and health and safety routines.
regular inspections of nuclear power stations.
regular maintenance and checks for safety.
protective clothing for workers.
regular monitoring of environmental risks outside the stations.
adopting a policy of short life-spans for reactors.
ensuring safe working practices for transporting waste.
developing new technologies to minimise the risk from waste.

*(any **two** risks, suitably discussed, **[2 marks]** each)*

e.g. x-rays:

risks - to patients if they do not receive the correct exposure or are treated too regularly.
to medical workers who may be exposed to high levels of radiation.
risk of malfunction of equipment so correct dosages are not delivered.
risk of contamination of the environment and to other patients.

Minimise by:

shielding staff.
the use of film badges to monitor exposure.
calculation and measurement of strength of dosage and length of exposure.
warning signs and security measures.
development of new technology with less risk to health.

*(any **two** risks, suitably discussed, **[2 marks]** each, **[1 mark]** extra for an astutely balanced argument to a maximum of **[9 marks]**)*